



AEROSPACE MATERIAL SPECIFICATION

AMS5703™**REV. F**

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Revised 2023-08

Superseding AMS5703E

(R) Nickel Alloy, Corrosion- and Heat-Resistant, Bars, Forgings, and Rings
and Stock for Forging
41.5Ni - 16Cr - 37Fe - 2.9Cb - 1.8Ti
Consumable Electrode or Vacuum Induction Melted
1750 °F (954 °C) Solution, Stabilization, and Precipitation Heat Treated
(Composition similar to UNS N09706)

RATIONALE

AMS5703F is the result of a Five-Year Review and update of the specification. The revisions updates the title to match the scope, revises size limits and associated exceptions (see 1.1, 3.8, and 8.4), updates composition testing and reporting (see 3.1 and 3.1.1), adds bar finish option (see 3.3.1.1.1), clarifies heat treatment by the addition of a table (see Table 2), adds strain rate control for testing (see 3.5.1.1.1), updates hardness testing requirements (see 3.5.1.2), adds grain size requirements based on size limits (see 3.5.1.3.1 and 3.5.1.3.2), clarifies additional property requirements for forging stock (see 4.4.3 and 8.5) and allow the use of prior revisions (see 8.3).

1. SCOPE

1.1 Form

This specification covers a corrosion- and heat-resistant nickel alloy in the form of bars, forgings, flash welded rings up to 4.00 inches (101.6 mm), inclusive, in nominal diameter or least distance between parallel sides (thickness) having a maximum cross-sectional area of less than 12.6 square inches (81 cm²) in the solutioned, stabilized, and precipitation heat-treated condition. Stock for forging or flash welded rings may be of any size and condition as ordered.

1.2 Application

These products have been used primarily for parts requiring a combination of resistance to creep and stress-rupture up to 1300 °F (704 °C), oxidation resistance up to 1800 °F (982 °C), and good machinability, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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Full document details: SAE AMS5703F

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS5703F/>

Documents

Document Sharing Hub

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), or www.sae.org.

AMS2261	Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Bars, Rods, and Wire
AMS2269	Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys
AMS2283	Composition Testing Methods for Nickel- and Cobalt-Based Alloys
AMS2371	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock
AMS2374	Quality Assurance Sampling and Testing, Corrosion and Heat-Resistant Steel and Alloy Forgings
AMS2750	Pyrometry
AMS2806	Identification Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels, and Corrosion and Heat-Resistant Steels and Alloys
AMS2808	Identification, Forgings
AMS7490	Rings, Flash Welded, Corrosion and Heat-Resistant Austenitic Steels, Austenitic-Type Iron, Nickel or Cobalt Alloys, or Precipitation-Hardenable Alloys
AS7766	Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM E8/E8M	Tension Testing of Metallic Materials
ASTM E10	Brinell Hardness of Metallic Materials
ASTM E112	Determining Average Grain Size
ASTM E139	Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials
ASTM E292	Conducting Time-for-Rupture Notch Tension Tests of Materials

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2283 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Carbon	--	0.06
Manganese	--	0.35
Silicon	--	0.35
Phosphorus	--	0.020
Sulfur	--	0.015
Chromium	14.50	17.50
Nickel	39.00	44.00
Columbium	2.50	3.30
Titanium	1.50	2.00
Aluminum	--	0.40
Boron	--	0.006
Tantalum	--	0.05
Copper	--	0.30
Iron	remainder	

3.1.1 The producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

3.2 Melting Practice

Alloy shall be produced by multiple melting using consumable electrode practice in the remelt cycle or shall be induction melted under vacuum. If consumable electrode remelting is not performed in vacuum, electrodes which have been produced by vacuum induction melting shall be used.

3.3 Condition

The product shall be supplied in the following condition:

3.3.1 Bars, Forgings, and Flash Welded Rings

Solutioned, stabilized, and precipitation heat treated and descaled.

3.3.1.1 Bars shall be hot finished; round bars shall be turned or ground.

3.3.1.1.1 Bars, other than hexagons, over 2.75 inches (69.8 mm) in nominal diameter or least distance between parallel sides shall be hot finished or cold finished.

3.3.1.2 Bars shall not be cut from plate (see 4.4.1).

3.3.1.3 Flash welded rings shall not be supplied unless specified or permitted on the purchaser's part drawing. When supplied, rings shall be manufactured in accordance with AMS7490.

3.3.2 Stock for Forging or Flash Welded Rings

As ordered by the forging or flash welded ring producer.